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AN OVERVIEW OF THE CHALLENGES AND PROSPECT OF WHITE BIOTECHNOLOGY*

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Biotechnology is a large field of science comprising various areas of study such as biochemistry, microbiology, biology, chemistry, chemical engineering, immunology, etc. White Biotechnology, mainly known as Industrial Biotechnology is the key technology that can positively impact the growth and development of future economy, environment, and society. White biotechnology integrates the use of modern technology and the application of biotechnology for cost-effective processing and manufacturing of chemicals, materials, and bio-energy or fuels. This technology employs the use of enzymes and micro-organisms to manufacture products in a broad scope of industrial sectors such as food and feed, polymers, chemicals, pharmaceuticals, paper and pulp, textiles, energy, and detergents [1]. Industrial biotechnology positively influences the environment since biotechnological processes are cost-effective users of renewable raw materials, creating less production cycle waste. In addition, switching from chemical to biological processes can result in a significant decrease in carbon dioxide emissions, energy consumption, and water use. So far, enzymatic and fermentation processes are normally exploited in the fine chemicals industry, to produce flavors, vitamins, pharmaceutical intermediates, etc. Collectively, these economic and environmental benefits will play a pivotal role in a more sustainable society, with greater job creation possibility and a decreased over-reliance on fossil fuels [2].

The key limitation for commercializing biotechnological products such as bacterial plastics has always been their cost since they are about 5–10 times more costly to produce compared to petroleum-based polymers. In addition, advance genetic modifications are still necessary to be incorporated into the plants for their

improvement, which may require unique harvesting and treatment procedures, compared to regular plants.

Undoubtedly, white biotechnology will transform into an essential technology model for sustainable growth of exploiting renewable materials. Withal, the effectiveness of the methods for the manufacturing of the various chemicals is necessary to be improved. Withal, several white biotechnology drivers are distinctly associated with the global challenges of energy security, climate change, and the financial crisis, hitherto, there are still several barriers to its growth and best uptake across industry sectors [2]. In this article, we intend to discuss the challenges and prospects of white biotechnology application.

References

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BIOVALORIZATION OF INDUSTRIAL WASTES AND BYPRODUCTS INTO ASTAXANTHIN VIA YEAST FERMENTATION*

Keywords: carotenoid, optimization, xanthophyll, *X. dendrorhous*, yeast.

Over the years, the burgeoning world population coupled with massive industrialization has resulted the generation and accumulation of an alarming amount of organic wastes. The disposal of these waste is of huge environmental concern and thus, development of sustainable, environmentally sound and cost-efficient strategies to deal with such wastes is an area of increasing importance in our society today [1, 2]. At present, most of these wastes are either incinerated, dumped on landfills or used in composting. These methods are, however, ecologically destructive as they result in the